
MWI Interworking with DMS

The Message Waiting Indication (MWI) feature allows a Message Center on either Meridian 1 or DMS-100 (Centrex) to exchange Message Waiting Indicator information with phones serviced by either type of system on the network. Calls redirected to the Message Center can be from private or public network callers on either system. A caller served by Meridian 1 can use the Message Center on DMS. A caller served by DMS can use the Message Center (Meridian Mail) on Meridian 1. The Meridian 1 must use a Meridian Mail as its Message Center.

MWI uses the non-call associated Facility messages on ISDN PRI for transporting the TCAP information.

The Meridian 1 and DMS systems can be connected directly or in tandem to whichever system hosts the Message Center. When a caller from either system leaves a message on either system, the Message Waiting Indicator is activated. When the receiver retrieves the message, the Message Waiting Indicator is deactivated. The indicator is either a visual LED (light emitting diode), an icon, or an audible tone in the telephone handset.

Figure 44 shows a network in which Meridian 1 hosts the Message Center that serves both Meridian 1 users and users of a DMS-100 in the same customer group.

Note: CCS#7 is not supported by the Meridian 1; CCS#7 must be a DMS-to-DMS configuration.

Figure 44
Private corporate network with Meridian 1 hosting the Message Center

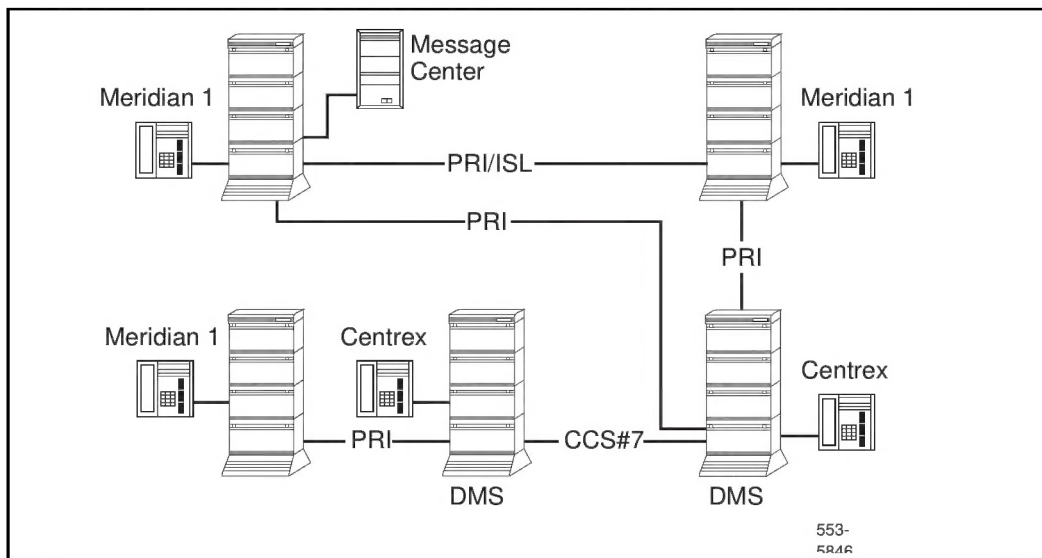
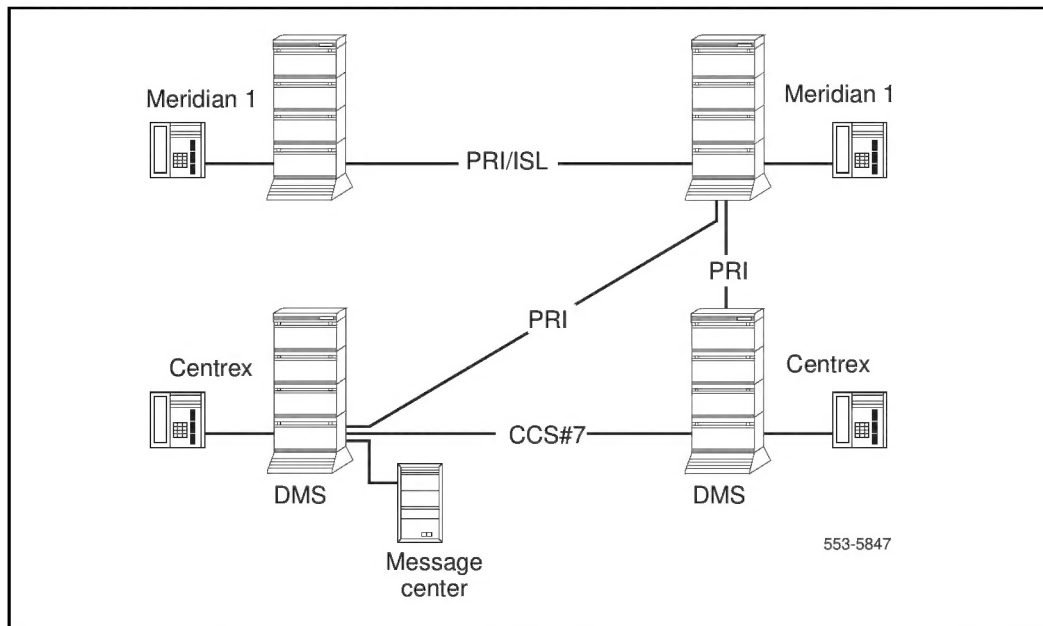


Figure 45 shows a network in which DMS hosts the Message Center that serves both Meridian 1 users and DMS users in the same or different enterprise groups.

Figure 45
Private corporate network with DMS hosting the Message Center



Note: CCS#7 is not supported by the Meridian 1; CCS#7 must be a DMS-to-DMS configuration.

Operating parameters

MWI supports DMS-100 and SL-100 as tandem switches, but no non-Northern Telecom switches as tandems.

Call redirection to Meridian Mail is based on the Network Call Redirection (NCRD) feature in X11 release 16. It is subject to the operating parameters of the NCRD feature.

MWI is based on the X11 release 16 Network Message Services-Meridian Mail (NMS-MM).

Only Meridian Mail is supported as the Message Center on Meridian 1.

Both DMS-100 (using BCS 36) and Meridian 1 can transport Facility messages for MWI and can be tandem switches. DMS-100 can tandem Facility messages from Meridian 1 to Meridian 1 for features such as Call Sender activated by Meridian 1 users of Meridian Mail. Other Facility messages that DMS-100 can tandem are for updating the voice mail softkeys of an M2317 or M3000 set.

MWI allows public and private numbers for the Original Called Number (OCN) in the Setup message during call forwarding, and for the Directory Numbers (DN) in the ORIG and DEST Information Elements (IE) of the Facility message to toggle the MWI indicator. The OCN refers to the user's mailbox DN. The OCN must be unique in the Meridian Mail database. If the call forwarding DN to the Message Center is a private number, then the OCN constructed in the setup message will contain a private number. If the call forwarding DN to the Message Center is a public number, then the OCN constructed in the setup message will contain a public number.

If Meridian Mail is on Meridian 1:

- For Meridian 1 users, Meridian Mail provides the same functions as for the X11 release 16 NMS-MM users, if a private number is used.
- For DMS users, some Meridian Mail features may not be available. Contact your local DMS administrator for available Meridian Mail features.

If the Message Center is on DMS:

- If a set on Meridian 1 does not have a DID number, the call forwarding DN to the Message Center should be private. Thus, a set that cannot receive DID calls will still be able to use the Message Center services provided that the DMS Message Center supports private numbers for the mailbox DNs.

End-to-End in-band signaling is required for accessing Message Center features for a local or remote switch.

The call forwarding connection from the caller to the Message Center on another switch must be with ISDN conductivity between Meridian 1 and DMS. This is for passing the OCN from the caller's switch to the switch that hosts the Message Center for leaving voice messages and for transporting TCAP messages to toggle the MWI indicator.

Feature interactions

- Multiple Customer
Serving multiple customers requires multiple Meridian Mail servers. MWI itself does not support multiple customers.
- Multi-Tenant Service
Meridian Mail Phase 8 supports Multi-Tenant Service. Tenants from the same customer can use one or more Message Center servers. Tenants from different customers cannot use the same Meridian Mail. The customer controls tenant access to MWI using the sets that belong to the tenant.
- Network Message Services, Meridian Mail
Although the Facility message for MWI uses a different TCAP format from that used for NMS, the X11 release 16 functions continue to operate. X11 release 19 Meridian 1 converts the message format when exchanging MWI Facility messages with earlier releases.
- DCH Error Monitoring
The X11 release 19 DCH Error Monitoring monitors ISDN messages on a per feature basis. If the MWI RCAP for the D-channel is added or deleted in LD 17, DCH Error Monitoring will work properly for the NMS feature when the D-channel message monitoring is disabled and then enabled.

- Trunk Optimization Before Answer
There is no Trunk Optimization when the call is redirected to DMS or answered by Meridian Mail. This applies to applications such as Auto Attendant.
- AML Link Recovery
AML Link Recovery redirects the calls to the ACD queue of the ACD Night Forward DN when the AML link goes down. This recovery is also available for calls in the Meridian Mail ACD queue on Meridian 1 when the AML link goes down.

Feature packaging

MWI Interworking depends on X11 release 19. See *X11 features and services* (553-3001-305) for X11 release software packages and their dependencies.

The package requirements for MWI are different for each node, as described in the following tables.

The originating node has Message Center users. Table 57 shows the originating node package requirements.

Table 57
Package requirements for an MWI originating node

Package	Name of package	Mnemonic
219	Message Waiting Indication (if connected to DMS/BCS36 for interworking)	MWI
10	End-to-End Signaling	EES
40*	Basic ACD	BACD
45*	ACD package A	ACDA
46	Message Center	MWC
145	ISDN Signaling	ISDN
146	ISDN Primary Rate Access	PRI
or 147	ISDN Signaling Link (for Meridian 1 to Meridian 1)	ISL
148	ISDN Network Service	NTWK
175	Network Message Service	NMS
* This package is required only if ACD DN is used as the Message Center DN.		

The host node holds the Message Center. Table 58 shows the host node package requirements.

Table 58
Package requirements for an MWI host node

Package	Name of package	Mnemonic
	X11 release 19 or above	
219	Message Waiting Indication (if connected to DMS/BCS36 for interworking)	MWI
10	End-to-End Signaling	EES
35	Integrated Message Service	IMS
40	Basic ACD	BACD
45	ACD package A	ACDA
46	Message Center	MWC
77	Command Status Link	CSL
145	ISDN Signaling	ISDN
146 or 147	ISDN Primary Rate Access	PRI
	ISDN Signaling Link (for Meridian 1 to Meridian 1)	ISL
148	ISDN Network Service	NTWK
175	Network Message Service	NMS

The tandem node does not have Message Center users. Table 59 shows the tandem node package requirements

Table 59
Package requirements for an MWI tandem node

Package	Name of Package	Mnemonic
219	Message Waiting Indication (if connected to DMS/BCS36 for interworking)	MWI
145	ISDN Signaling	ISDN
146 or 147	ISDN Primary Rate Access ISDN Signaling Link (for Meridian 1 to Meridian 1)	PRI
148	ISDN Network Service	

Feature implementation

Use the following steps to configure MWI.

Figures 46 and 46 show the configuration requirements for MWI Interworking.

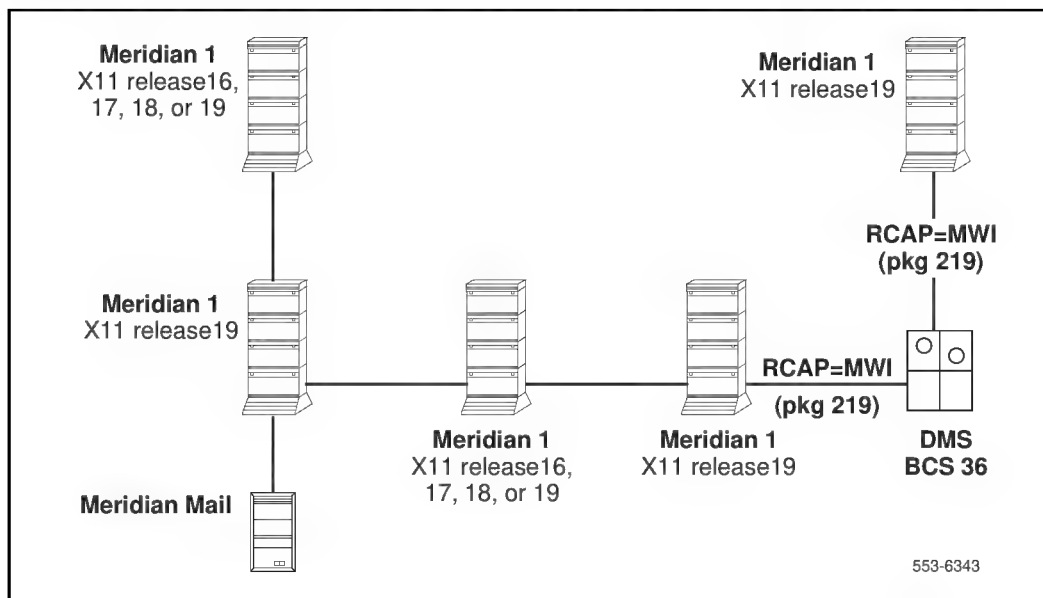
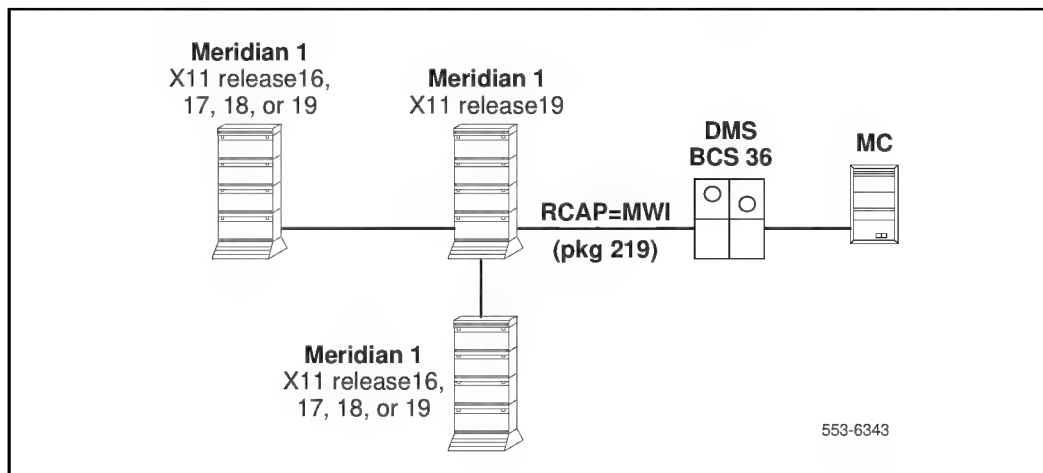
Procedure 25

Use LD 17 to configure remote D-channel capability

Prompt	Response	Description
REQ	CHG	Change system data
TYPE	CFN	Configuration record
ADAN	CHG DCH 0-63	Change Primary D-Channel
RLS	19, 36	Release ID of the switch at the far end of the D-channel interface. 19 is Meridian 1, 36 is DMS.
RCAP	MWI XMWI	Add remote D-channel capabilities for MWI Remove remote D-channel capabilities for MWI

If the Message Center is on a Meridian 1, it must be a Meridian Mail. No other messaging devices are supported for the Meridian 1. The DMS may use Meridian Mail or other messaging devices (Octel) for its Message Center.

If the Message Center is on DMS for MWI Interworking, a Meridian 1 that is connected to DMS must be on Release 19; other Meridian 1 switches that are connected to the Release 19 switch can be Release 16, 17, or 18.

Figure 46**Configuration requirements for MWI interworking with Meridian Mail on the Meridian 1****Figure 47****Configuration requirements for MWI interworking with the Message Center on the DMS**

Procedure 26

Use LD15 to enable Message Service

Prompt	Response	Description
REQ	CHG	Change.
TYPE	CDB IMS_DATA	Customer Data Block Release 21 gate opener.
CUST	0-99	Customer number
- IMS	YES	Change Integrated Message System
- IMA	YES	Enable Integrated Message System

Procedure 27

Use LD 23 to configure an ACD Group for the Message Center users in the remote switch

Prompt	Response	Description
REQ	NEW, CHG	Add or change system data
TYPE	ACD	Automatic call distribution
CUST	0–99	Customer number
ACDN	xxxx	ACD Directory Number
MWC	YES	ACD DN message center DN
NCFW	xx ... xx	Message Center DN: — a public DN (10 digits) prefixed by an ESN access code. — an ESN number prefixed by an ESN access code Note: Do not define an agent for this ACD group to allow for the automatic call redirection to the ACD Night Call Forward DN where the Message Center DN is defined.

Procedure 28**Use LD 11 to define the ACD Group as the Message Center DN for each telephone**

Prompt	Response	Description
REQ	CHG	
FDN	x..x	Flexible call forward No Answer to Message Center DN
EFD	x..x	Call Forward by Call Type—External No Answer to Message Center DN
EHT	x..x	Call Forward by Call Type—External Hunt to Message Center DN
HUNT	x	Hunt to Message Center DN
KEY	xx MWK x..x	Message Waiting Key, where x..x is the Message Center DN.

Procedure 29
Use LD 15 to configure AC2 to insert ESN access code and PNI

Prompt	Response	Description
REQ	NEW, CHG, END	
TYPE	CDB NET_DATA	Customer Data Block Networking Data (Release 21 gate opener)
...		
- AC2		Access code 2. Enter call types (type of number) that use access code 2. Multiple call types can be entered. Default is to access code 1.
	NPA	E.164 National
	NXX	E.164 Subscriber
	INTL	International
	SPN	Special number
	LOC	Location code
- ISDN	YES	Change ISDN options
- PNI	1–32700	Customer private identifier—unique to a customer. Within one network, use the same value for PNI in both the Customer Data Block (LD 15) and the Route Data Block (LD 16) in all PBXs.
...		
- HNPA	200- 999 1200- 1999	Home Number Plan Area code defined in LD 90
- HNXX	100–9999	Prefix for the central office
- HLOC	100–999	Home location code (NARS)
- LSC	1–9999	1- to 4-digit Local Steering Code established in the Coordinated Dialing Plan (CDP). The LSC prompt only appears if user has a 5- or 6-digit dialing plan.

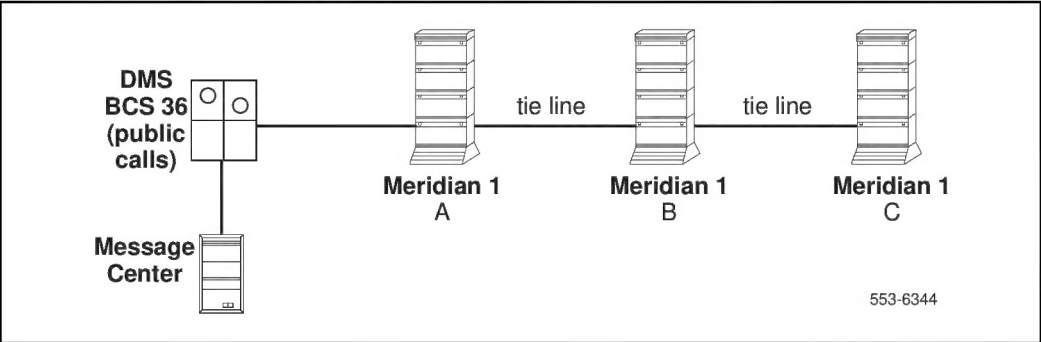
For ISDN Networking Features such as NRAG, NMS and MWI, the originating switch must not use the digit manipulation (DMI) to insert the ESN access code. The ESN access code must be inserted at the terminating/tandem node via the INST prompt if it connects to the DMS in the Public Network.

Procedure 30**Use LD 16 to configure PNI and INAC or INST**

Prompt	Response	Description
REQ	NEW,CHG,OUT	
TYPE	RDB	Route Data Block
...		
- PNI	1–32700	Customer private identifier—unique to a customer. Within one network, use the same value for PNI in both the Customer Data Block (LD 15) and the Route Data Block (LD 16) in all PBXs.
- INAC	(NO), YES	Insert access code. Permit an ESN access code to be automatically added to an incoming ESN call from a private network. If INAC is YES, the digit insertion option (INST) is bypassed. This prompt only appears if the route type is a TIE trunk.
- INST	(0)–99999999	Digits to be inserted in front of leading digits. Use this prompt if route is used for connection to DMS.

Use “INST” in LD 16 at Meridian 1 location A for incoming tandem/terminating calls. Use “INAC” at Meridian 1 locations B and C.

Figure 48
 When to use INAC or INST in LD 16



For the message center users on M-1, configure Home Location Code and Home NPA to terminate a Facility message from the message center either on M-1 or on DMS to the message center user’s switch. The Facility message is for turning on/off the message waiting indicator for the user.

For the private ESN Uniform Dialing Plan, use LD 90 to configure Home Location Code (HLOC)

Procedure 31
 Use LD 90 to configure Home Location Code

Prompt	Response	Description
REQ	NEW, CHG	Add or change
CUST	xx	Customer number (0–99)
FEAT	NET	Network translation tables
TRAN	AC1, AC2	Access code 1 or 2
TYPE	HLOC	Home location code
HLOC	xxx	Home location code (3–7 digits)

For the public numbering plan, a 10 digit number (NPA+NXX+XXXX) is used in the ORIG and DEST IE of the Facility message. Use LD 90 to configure Home NPA and Central Office Translation (NXX) to terminate the Facility message onto the message center user's DN.

Procedure 32**Use LD 90 to configure Home NPA**

Prompt	Response	Description
REQ	NEW, CHG	Add or change
CUST	xx	Customer number (0–99)
FEAT	NET	Network translation tables
TRAN	AC1, AC2	Access code 1 or 2
TYPE	HPNA	Home NPA Translation
HNPA	xxx	Home NPA

Procedure 33**Use LD 90 to configure Central Office Translation**

Prompt	Response	Description
REQ	NEW, CHG	Add or change
CUST	xx	Customer number (0–99)
FEAT	NET	Network translation tables
TRAN	AC1, AC2	Access code 1 or 2
TYPE	NXX	Central Office Translation
NXX	xxx	Office code translation
RLI	0–255	Route list index
SDRR	LDID	Recognized local DID codes
DMI	1–255	Digit manipulation table index. DMI should delete 3 digits.
LDID	xxx	Local DID number recognized within the NPA and NXX.

Procedure 34
Use LD 22 to print the configuration record

Prompt	Response	Description
REQ	PRT	Print system data
TYPE	CFN	Configuration record
RLS	xx	Release ID of the switch at the far end of the D-channel
RCAP	MWI	Remote D-channel capabilities

Note: The mnemonic “MWI” is printed for overlay 22.

Feature operation

MWI performs two basic operations: 1) activate the MWI at the caller’s set; 2) deactivate the MWI at the subscriber’s telephone. Table 60 shows the sequence that activates the MWI. Table 61 shows the sequence that deactivates the MWI.

Table 60
When MWI is activated

Sequence	Caller	Receiver	Message Center
1	Calls receiver	Receiver not available	
2	Leaves a message		Records caller's message
3	Hangs up		Activates MWI on receiver's set

Table 61
When MWI is deactivated

Sequence	Receiver	Message Center
1	Notifies MWI	
2	Calls the Message Center	Plays messages
3	Clears the mailbox	
4	Hangs up	Deactivates MWI on receiver's set

Some of the failures that can occur and how MWI handles them are:

- AML/CSL link failure
If the AML/CSL link fails between Meridian Mail and its host Meridian 1, calls are redirected to the ACD Night Call Forward DN for the ACD queue involved.
- D-channel failure
If the D-channel is out of service, the Facility message is lost. For Meridian Mail, an MWI CSL message is sent to the Meridian Mail server.
- Inconsistent data base
If the Facility message that toggles MWI cannot be delivered to the caller's set because the DN is invalid or MWI is not supported in the remote switch, an MWI CSL message is sent to Meridian Mail.